

REMARKS

Applicants' attorney wishes to thank the Examiner for the careful consideration given to this application. For convenience, the matters raised in the action are discussed below in the same order as presented by the Examiner.

In response to paragraph 1, a substitute set of formal drawings are presented. The substitute drawings include uniformly thick lines and reference numerals that are more clear. In addition, the reference numerals 14 and 15 are remote of the drawing lines.

For convenience of amendment, the previously pending claims have been cancelled in favor of claims 12 - 25 presented herein. Each of the claims require a diffuser having a convergent nozzle connected to a divergent nozzle for opening drawn filaments together with a rail for electrostatically charging the open filaments to form charged filaments.

The claims have been further amended to set forth the cooperation of the diffuser and the electrostatically charging to enhance the opening or spreading of the filaments. There is also a reduction

in the occurrence of the rebound phenomena wherein filament rebound upon impacting the receiving belt detracts from the uniformity of the web. These recitations are particularly supported in the first paragraph of the "Summary of the Invention" bridging pages 4 and 5 of the application.

Claims 12 - 14 are specific to the use of venturi effect to produce intake flows of air and to the use of one or more slots to direct the air into contact with the filaments to assist in slowing the passing filaments. Claim 13 presents additional details as to the drawing assembly and diffuser slot. Claim 14 is specific to the embodiment of FIG. 2 wherein multiple slots are used to intake air for contact with the filaments. Claim 15 is specific to diffuser air intake by venturi effect only and claim 16 is specific to the location of the rail between the divergent nozzle and the receiving belt. Claims 17, 18 and 19 are specific to the embodiment of FIG. 3. Claim 17 positions the rail upstream from the divergent nozzle, claim 18 recites a rectilinear slot connecting the nozzles, and claim 19 positions the rail in the rectilinear slot.

Claims 20 and 21 are specific to the embodiment of Fig. 2. Claim 22 is specific to the embodiment of Fig. 2. Claim 22 is similar to claim 13. Claim 23 is specific to diffuser air intake by venturi effect only. Claim 24 specific to the rail location of Fig. 2. Claim 25 is broadly directed to the combination of the diffuser and the rail for electrostatically charging.

The prior claim rejections are discussed below with reference to the presently pending claims.

The prior rejection of the claims as being unpatentable under 35 USC 103(a) over Balk in view of Trimble et al. is in error.

It is noted that Balk does not disclose a diffuser device including a convergent nozzle and a divergent nozzle as set forth in the claims. In Balk, the drawing assembly includes a convergent-shaped portion. Accordingly, Balk does not have a diffuser with such form. Trimble et al. do not remedy the deficiencies of Balk.

It is requested that the Examiner reconsider and withdraw the rejection of the claims under 35 USC

103(a) as unpatentable over Geus et al. in view of Trimble et al.

Each of the claims presently of record recites both the use of a diffuser having convergent and divergent nozzles together with an electrostatic rail. Although the separate features of the claim may be taught in the prior art, there is no suggestion that these be used together in order to achieve improved opening of the filament bundles.

When only the nozzle approach is used, there is a tendency for the filaments to stick together. On the other hand, when only an electrostatic rail is used, the charged filaments tend to open to an undesirably large distance, i.e. the distance between one filament and another is too large and adversely affects the regularity or uniformity of the nonwoven.

Surprisingly, when both convergent/divergent nozzles and an electrostatic rail are used, the filaments do not tend to stick together and the opening distance is not undesirable. This preferred filament opening and spacing is believed to be the result of the divergent nozzle air flow limiting the spacing achieved

by the electrostatic rail. The divergent nozzle limiting effect upon the electrostatic rail is not suggested by the prior art.

The prior art contains no suggestion of the combination of the claimed diffuser and electrostatic device. Accordingly, there is no motivation for the proposed combination of teachings upon which the claims are rejected.

Heretofore, the art has separately employed air diffusers and electrostatic charging devices for purposes of opening the filaments. The cited art is representative of this. For example, the teaching in the Geus et al. patent is that a diffuser provides satisfactory opening of the filaments with regulation of the ratio of air flow through passage 8 and in the flat nozzles 90. The flat nozzles 90 are indicated to induce oscillations to open the filaments. (Column 4, lines 48 - 57) The Trimble et al. teaching is that electrostatic charging sufficiently spreads the filaments.

For all of the foregoing reasons, it is submitted that claims 12 - 25 are distinguished over the art. Additional patentably distinguishing limitations are summarized below.

Further, it is emphasized that the following additional features are not shown alone and/or in the claimed diffuser and electrostatic charging system by the prior art. Claims 13 and 22 are directed to slot air delivery at the drawing slot. Claim 14 is specific to the use of multiple venturi produced air flows into the diffuser including flow through a slot extending through the diffuser and opening into the divergent nozzle. Claims 15 and 23 are specific to the use of the venturi effect only to produce air intake to the diffuser. Claims 16 and 24 are specific to the location of the rail between the divergent nozzle and the receiving belt. Claim 17 positions the rail upstream of the divergent nozzle. Claim 18 recites the use of a rectilinear slot to connect the convergent and divergent nozzles. Claim 19 positions the rail in the rectilinear slot. Claim 21 is directed to the use of multiple slots to provide air to the diffuser.

Appln. No. 10/030,880
Amdt. dated June 29, 2004
Reply to Office action of April 1, 2004

For all of the foregoing reasons, it is respectfully submitted that all of the claims presently of record are in condition for final allowance and such action is requested.

If there are any fees required by this communication, please charge such fees to Deposit Account No. 16-0820, Order No. 34051.

Respectfully submitted,

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June 29, 2004